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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,029	07/22/2003	Massimo Grasso	2-2546	9534
2352	7590	12/07/2004	EXAMINER	
OSTROLENK FABER GERB & SOFFEN 1180 AVENUE OF THE AMERICAS NEW YORK, NY 100368403			NGUYEN, HIEP	
			ART UNIT	PAPER NUMBER
			2816	

DATE MAILED: 12/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/625,029

Applicant(s)

GRASSO ET AL.

Examiner

Hiep Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 8-13, 17-19 and 22-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 14-16, 20 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restriction

Restriction to one of the following inventions is required under 35 U.S.C. 121:

This application contains claims directed to the following patentably distinct species of the claimed invention:

- a. Species A, corresponding to figures 1 and 2, claims 1-7, 14-16 and 20-21;
- b. Species B, corresponding to figure 4, claims 8-11, 17-19 and 22-27;
- c. Species C, corresponding to figures 5 and 6, claims 12-13;

During a telephone conversation with Attorney Brendan J. Kennedy (Reg. No 41,890) on 11-29-04 a provisional election was made with traverse to prosecute the current sense circuit of claims 1-7, 14-16 and 20-21. Affirmation of this election must be made by applicant in replying to this Office action. Claims 8-13, 17-19 and 22-27 are therefore withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Objections

Claim 3 is objected to because of the following informalities: "the sense resistant" on line 2 should be --the sense resistor--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-7, 14-16, 20 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Correction and/or clarification is required.

Regarding claim 1, the recitation "a sense resistor coupled to the shunt resistor for **dividing** current supplied to the shunt resistor" on lines 3-4 is indefinite because it is misdescriptive. Figure 1 or 2 of the present application shows that the shunt resistor (12) and

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the sense resistor (14) belong to two separate paths. Thus, they are isolated from each other and the sense resistor cannot **divides** “current supplied to the shunt resistor” as recited. The recitation “a resistance value...to cover a range of sensed current” on lines 5-7 is indefinite for the same reason. The sense resistor and the shunt resistor are isolated from each other therefore, they cannot produce a gain based on the ration of these resistors.

Regarding claim 6, the recitation “a **reference current value** subtracted from a sensed current through the sense resistor to offset the bias voltage” is indefinite because it is not clear what the “a **reference current value:**” is and how it can be subtracted from a sensed current through the sense resistor to **offset the bias voltage**. The Applicant is requested to show the “a reference current value” in the drawing and to explain how it can be **subtracted** from a sensed current through the sense resistor to **offset the bias voltage**.

Regarding claim 7, the recitation “ a **reference current storage element** coupled to the sense resistor for **storing the reference current value**” is indefinite because it is not clear what is a ‘reference current storage element’ and how a **current** can be stored. Explanation is required.

Regarding claim 14, the recitation “providing a sense resistor coupled to the shunt resistor to obtain a **current divider circuit** ‘ is indefinite because it is misdescriptive. Figures 1 and 2 of the present application show that the sense resistor and the shunt resistor belong to two separate paths thus they cannot form a “current divider circuit” as recited.

Regarding claim 20, the recitation “**dividing current** through the wire between the resistance and a current sensor having a gain relationship with the shunt resistor” on lines 4-5 is indefinite because it is misdescriptive. Figures 1 and 2 of the present application show that the two resistors (12) and (14) are isolated thus, there is no divider circuit formed by them. The recitation “the shunt resistor” on line 5 does not have antecedent basis. It is not clear as to the “shunt resistor” is the same or different than the “a resistance” on line 2. The Applicant is requested to point out in the drawing the “ a resistance”, “a current sensor” and “the shunt resistor” and to explain how these elements can divide current.

Claims 2-5, 15, 16 and 21 are indefinite because of the technical deficiencies of claims 1, 14 and 20.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 14, 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Kitamura. (US Pat. 6,316,983).

Regarding claim 1, figures 14 and 15 of Kitamura show a method for sensing current in a wire, comprising:

providing a shunt resistor (R_s) in the wire to generate a voltage related to current through the wire;

providing a sense resistor (R_L) coupled to the shunt resistor to obtain a "current divider circuit" ;

measuring current flow through the sense resistor (R_L); and

determining current flowing through the shunt resistor based on a specified relationship (G) between the shunt resistor and the sense resistor. The gain ratio (G) establishes the desired relationship between the shunt resistor and the sense resistors.

Claims 1-7, 14-16, 20 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Thelen, Jr. (US Pat. 5,231,315).

Regarding claims 1-4, figure 2 of Thelen show a current sense circuit comprising a shunt resistor (20), a sense resistor (11). The resistance of the sense resistor (11) is selected (by switch circuit) so that the gain (ratio) of the two resistor establishes a range of current for the sense resistor (11). The buffer is element (13). The voltage applied on the sense resistor is a DC voltage thus, the direction of the current through the sense resistor is constant. The bias voltage is (V_{ref}).

Regarding claim 5, it is inherent that in a circuit the resistors have the thermal coefficients selected to be equal or the ratio of thermal coefficients of the resistors is selected

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to be equal approximately to one for equal variation of the resistors with respect to the temperature to keep the ratio of current values flowing through the resistors equal.

Regarding claim 6, the bias voltage (V_{ref}) can be offset by the operation of the switches ($S1-S_n$) of the resistor network (20).

Regarding claim 7, resistor network (11) converts a current to a voltage in a form of storage.

Regarding claims 14-16, figure 2 of Thelen shows a method for sensing current in a wire, comprising:

- providing a shunt resistor (20) in the wire to generate a voltage related to current through the wire;

- providing a sense resistor (11) coupled to the shunt resistor to obtain “a current divider circuit”;

- measuring current flow through the sense resistor (11), and determining current flowing through the shunt resistor based on a specified relationship between the shunt resistor and the sense resistor. Note that the current flowing through the sense resistor (11) depends on the selected value of the shunt resistor (20). The voltage applied on the sense resistor (11) is a DC voltage thus, the direction of the current through the sense resistor is constant.

Regarding claim 20 and 21 figure 2 of Thelen shows a method for sensing current in a wire, comprising:

- providing a resistance (20) in the wire to develop a voltage when current flows through the wire;

- “dividing current” through the wire between “the resistance” and a “current sensor” (11) having a gain relationship with the “shunt resistor”; and

- modifying the current sensor (11) by activating switches (S_a-S_z) to change the gain relationship to establish a desired gain relationship between the current sensor (11) and “the resistance” (20), whereby the current sensor is capable of sensing current through the resistance over an entire dynamic range of operation. The resistance in the current sensor (11) can be changed to obtain a desired gain relationship between the current sensor and “the resistance”.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura. (US Pat. 6,316,983).

Regarding claim 1, figures 14 and 15 of Kitamura show a current sense circuit, comprising:

a shunt resistor (RL) in a current path for measuring current in the current path;

a sense resistor (Rds) coupled to the shunt resistor for “dividing” current supplied to the shunt resistor; and

a resistance value for the sense resistor (Rds) is adjustable so that the ratio of the shunt resistor value to the sense resistor value produces a gain (G). Kitamura does not show that the resistance value for the sense resistor (Rds) is selected so that the gain is “suitable for establishing a range of current measurements to cover a range of sensed current”. However, it is well known to those having skill in the art that the value of the sense resistor (Rds) can be adjusted so that the current flowing through the sense resistor is within a desired range.

Regarding claim 2, the voltage buffer is element (203).

Regarding claim 5, it is well known to one skilled in the art that the ratio of thermal coefficients of the resistors is selected to be equal approximately to one for equal variation of the resistor values with respect to the temperature to keep the ratio of current values flowing through the resistors equal.

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Conclusion

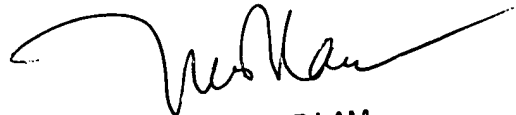
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hiep Nguyen whose telephone number is (571) 272-1752. The examiner can normally be reached on Monday to Friday from 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Callahan can be reached on (571) 272-1740. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hiep Nguyen

12-01-04



TUAN T. LAM
PRIMARY EXAMINER